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Nutritional Screening of Utah Rural and Urban Elderly

Rachel Taylor Rood
Utah State University

NUTRITIONAL SCREENING OF UTAH RURAL AND URBAN ELDERLY

by

Rachel Taylor Rood

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ABSTRACT

Nutritional Screening of Utah Rural and Urban Elderly

by

Rachel Taylor Rood, Master of Science

Utah State University, 1994

Co-Major Professors: Dr. Georgia C. Lauritzen and Dr. Carol T. Windham
Department: Nutrition and Food Sciences

The population of Americans over age 65 is expected to increase from a reported 12 percent in 1988 to 22 percent by the year 2030. Nutrition screening and intervention can help combat the rising need for health care and other services among the elderly by preventing or delaying disability and dependency.

This study was designed to determine the degree of nutritional risk present within the elderly population in rural and urban areas in the state of Utah by conducting an initial nutrition screening using the *Determine Your Nutritional Health* checklist developed by the Nutrition Screening Initiative. Congregate meal sites were stratified according to urbanization and fifteen centers were selected from both rural and urban counties. Congregate meal participants present at the site completed a *Determine Your Nutritional Health* checklist and survey asking additional demographic data including

age, sex, marital status, living situation, frequency of participation in congregate meals, and if they had previously used the checklist.

A total of 838 valid surveys was collected from 29 congregate meal sites throughout the state of Utah. Fifty-seven percent of participants scored in the "good nutritional health" category, 27.7 percent were at moderate nutrition risk, and 15.4 percent scored in the high nutrition risk category.

Nutrition risk category was significantly associated with gender, marital status, and cohabitation status. Women, unmarrieds, and individuals living alone scored more frequently in a higher nutrition risk category.

Results of this study reflect influences on nutrition risk found in a sample of congregate meal participants in the state of Utah. These results can help the state of Utah identify the common risk factors within this segment of its population, i.e. gender, marital status, cohabitation status, acute/chronic disease, eating alone, and polypharmacy, to plan education and/or intervention for individuals who are at risk.

(75 pages)

CHAPTER I

INTRODUCTION

Background Information

The population of Americans over age 65 is expected to increase from a reported 12 percent in 1988 to 22 percent by the year 2030 (White et al. 1991). Between the years 1900 and 2000, the number of people aged 85 years or older is projected to increase by 57 percent in the state of Utah (Kovar and Feinleib 1991). This rapid aging of the U.S. population places an increasing demand on health care dollars (Nestle and Gilbride 1990; Kovar and Feinleib 1991). The best way to combat the rising need for health care and other services among the elderly is to prevent or delay disability and dependency (Kovar and Feinleib 1991).

Nutrition has become a primary focus in helping the elderly maintain independence and prolong length as well as quality of life. This was recognized by the U.S. Department of Health and Human Services in its *Healthy People 2000* report which included nutrition-related objectives in an effort to meet the overall goal of maintaining health and functional independence in the elderly population (Posner et al. 1993b).

Elderly Malnutrition

An estimated 85 percent of older Americans suffer from chronic diseases and conditions that may benefit from nutrition intervention (Cope

1994). Diseases that can be nutritionally prevented or delayed include chronic diet-related diseases as well as nutritional deficiency states (Roe 1990). Diet has been linked to incidence of atherosclerosis, coronary heart disease, hypertension, and obesity, as well as some cancers, osteoporosis, diabetes mellitus, hepatobiliary disease, alcoholism, and dental caries. Poor nutrition may also exacerbate already present conditions such as diabetes, renal disease, hypercholesterolemia, hypertension, gastrointestinal problems, and congestive heart failure (Dwyer 1991).

Malnutrition has become a widespread problem in the elderly population and is often present in the absence of other major illness (Manson and Shea 1991). Lowick et al. (1990), who conducted a national screening of "apparently healthy" Dutch elderly, found a significant presence of marginal values for various indicators of nutritional status. There was an increased incidence of obesity compared to younger adults. Abnormal osteoporosis-related parameters included low plasma 25-hydroxyvitamin D and decreased urine calcium excretion. Risk factors for cardiovascular disease including hypertension, serum cholesterol, and serum low-density lipoproteins were elevated. All of these indicators represent preventable nutritional risk factors. Lowick's study is significant because the presence of malnutrition can compromise immune function, worsen preexisting disease, lead to complications, and ultimately result in increased health care costs (Dwyer 1991).

Screening for Malnutrition

Early identification and prevention of malnutrition can be accomplished through nutritional screening (Kovar and Feinleib 1991). Nutrition screening initiates the process of intervention through early recognition of malnutrition. Treatable causes can then be identified, addressed, and followed-up by active prevention programs aimed at increasing older persons' awareness of their nutritional health (Morley 1990). Screening best utilizes time and money, alleviating some of the financial strain placed on the health care system. Screening can also lead to care to help the elderly maintain independence and improve their quality of life (Dwyer 1991).

Until recently, standard or validated screening tools were unavailable. In 1991, through a coordinated effort of public and private health professionals from many disciplines including nutrition and medicine, the *Nutrition Screening Initiative* (NSI) was developed (American Academy of Family Physicians [AAFP] et al. 1991a). The Initiative comprised a five-year, multifaceted effort to promote routine nutrition screening and improve nutrition care focused on the elderly. The Initiative provides a systematic three-tiered approach to screening which includes three levels of tools designed generically for use in various elderly population groups.

The initial screening tool consists of a self-assessment "checklist" designed for use as both a screening and an educational tool. The checklist

questions were compiled after extensive research concerning the risk factors associated with poor nutritional health in the elderly population. The *Determine Your Nutritional Health (DYNH)* checklist (Appendix A) is a validated survey consisting of ten questions regarding nutritional risk factors that can be answered yes or no. If an elderly individual's response to a question is yes, he/she circles the number associated with that question. At the end of the questionnaire, the individual totals the circled numbers to obtain an overall nutritional score. The nutritional score falls into one of three categories: good, moderate nutritional risk, or high nutritional risk.

The screening tool also functions as an educational tool for the subjects because each risk factor is described in detail on the back. The purpose is to "provide basic nutrition information to people regarding characteristics that may increase the likelihood of poor nutritional status and guide consumers to begin a dialogue with their health and social services providers about personal nutritional concerns" (White et al. 1992, p. 163). Through use of the checklist, elders can become aware of the factors influencing nutritional health. Awareness may lead to lifestyle changes and diet modification and prompt elderly people to seek professional help when necessary (AAFP et al. 1991b).

If the checklist shows an individual to be at nutritional risk, then the second tool called the Level 1 Screen is used to identify those who would benefit from community services and/or medical evaluation. The Level 1 Screen can be administered by health or social service professionals and

includes questions concerning height, weight, eating habits, lifestyle, and socioeconomic and functional status (AAFP et al. 1991b). The Level 1 Screen was designed to distinguish between individuals of high nutritional risk and those with moderate nutritional risk who may need additional intervention (White et al. 1992). Those individuals at moderate risk may benefit from preventive interventions such as dietary counseling, food stamps, economic assistance programs, congregate and home-delivered meals, and other related services (White et al. 1992). Those individuals at high nutritional risk are referred for a Level 2 screen.

The Level 2 Screen should be completed by a health care professional as it contains specific diagnostic information including detailed weight history, anthropometric measurement, biochemical and clinical indicators of malnutrition, and other nutrition-related disorders (AAFP et al. 1991b). The goal of the Level 2 Screen is to identify nutritional problems early and to intervene, when possible, before health and quality of life are seriously impaired (White et al. 1992).

Problem Statement

The preventative relationship between nutrition and degenerative disease has been well documented. Delaying dependence and disability among Utah's elderly can relieve some of the financial burden placed on the health care system by this expanding population. Therefore, the state of Utah needs information to identify the extent and degree of nutritional risk present in the elderly population to effectively plan and budget for health prevention, education, care programs, and allocation of services.

Purpose and Objectives

The overall purpose of this study was to determine the degree of nutritional risk present within the elderly population in rural and urban areas in the State of Utah by conducting an initial nutrition screening.

Specific objectives were to:

1) quantify the degree of nutritional risk present in the elderly population participating in congregate meal programs;
2) identify any differences in risk levels between urban and rural locations;
3) identify the need for education and/or intervention for those individuals at risk; and

4) alert available community services and health professionals to the need for follow-up and encourage implementation of additional screening tools provided by the Nutrition Screening Initiative.

CHAPTER II

REVIEW OF THE LITERATURE

Risk Factors for Elderly Malnutrition

There are a variety of physiological, sociological, and psychological components that influence an individual's nutritional health. The Nutrition Screening Initiative has identified specific risk factors for malnutrition that are "characteristics that are associated with an increased likelihood of poor nutritional status" (AAFP et al. 1991b, p. 2). These characteristics include: inappropriate food intake, poverty, social isolation, dependency, disability, acute and chronic diseases or conditions, chronic medication use, and advanced age (AAFP et al. 1991a). Although many of these factors are interrelated, they are individually addressed by the *Determine Your Nutritional Health* checklist.

Inappropriate Food Intake

Inadequate or excess consumption of any nutrient compromises nutritional status. The *Determine Your Nutritional Health* checklist addresses two common areas of inappropriate food consumption in the elderly population: 1) meal frequency and 2) inadequate fruit, vegetable, and milk product intake (AAFP et al. 1991a).

Meal Frequency. Erratic meal patterns, consistent absence of food intake, and lack of sufficient, acceptable food all contribute to inadequate food intake and poor nutritional status (AAFP et al. 1991a). Using data from the 1977-78 Nationwide Food Consumption Survey (NFCS) data, Murphy et al. (1990) analyzed the impact of numerous sociodemographic, health-related, and eating behavior variables on the dietary adequacy of the elderly. The investigators found the number of meals consumed over the three-day period to be a strong predictor of dietary quality, second only in significance to energy intake.

Fruit, Vegetable, and Milk Product Intake. Fiber, calcium, and vitamins A and C are nutrients commonly reported as inadequate in older Americans' diets (Fanelli and Stevenhagen 1985). Ingwersen and Hama (1985) conducted a supplemental survey to the USDA's 1977-78 NFCS, using 2,066 households with one or more persons 65 years or older. Analysis of dietary intake measured by 24-hour dietary recalls and 2-day food records indicated that 44 percent of surveyed elderly households did not meet the 1974 Recommended Daily Allowance (RDA) for seven nutrients: protein, calcium, iron, vitamin A, thiamin, riboflavin, and ascorbic acid. Also, the nutritive values per 1,000 kilocalories were low for most of the seven nutrients, especially calcium and vitamin A. Households meeting the RDA for all seven nutrients spent more for home food; used larger quantities of most kinds of foods, particularly fruits vegetables and dairy

products; selected a greater variety of foods; and had food supplies with higher nutrient-to-calorie ratios for more nutrients. The authors of this study concluded that simply choosing more milk products and fruits and vegetables would improve the nutrient content of elderly household diets.

Elders who consume fewer than two meals per day may not meet the RDA for many nutrients including calories. Those who consume few fruits, vegetables, and milk products often do not meet the RDA for calcium, vitamin A, vitamin C, and other nutrients common to those foods. Because of these concerns, questions addressing these problems were included in the DYNH checklist as indicators of nutritional risk.

Poverty

Economic status is an indirect determinant of nutritional adequacy because it affects the quantity and quality of food purchased (Bidlack 1986). The DYNH checklist addresses poverty with the statement "I don't always have enough money to buy the food I need" (see Appendix A, p. 53 in this thesis. All subsequent DYNH checklist quotations refer to same page number). This question applies to the low-income population as well as to those with limited food expenditure resources. The average older person in the U.S. spends 18 percent of his/her income on health care, which limits money available for food (Ferrini and Ferrini 1993).

Ryan and Bower (1989) used 24-hour recalls from 268 South Carolinian adults aged 55 and over to compare nutritional status and

socioeconomic status. The authors looked at four index nutrients (iron, vitamin B-6, calcium, and vitamin A) and defined adequacy as 67 to 133 percent of the RDA for all four nutrients. Eighty-nine percent of their subjects had inadequate nutrient intake. The study also demonstrated a positive relationship between nutritional intake and socioeconomic status.

Undernourishment, secondary to poverty, can be dealt with by using social services such as congregate meals, Meals on Wheels, and food stamps. Education that teaches inexpensive, nutrient-dense shopping and food preparation can also reduce malnutrition caused by lack of financial resources (AAFP et al. 1991a).

Social Isolation

In American society, food is an important component of social life. Lack of social contact often causes decreased appetite, less interest in food, and apathy toward eating, resulting in poor nutritional intake (Ryan and Bower 1989; Walker and Beauchene 1991). The *Determine Your Nutritional Health* checklist uses the statement "I eat alone most of the time" to identify elders who experience social isolation. Walker and Beauchene (1991) found a significant negative correlation between a loneliness index score and nutrient adequacy ratios for protein, iron, phosphorus, riboflavin, niacin, and ascorbic acid in the diets of 61 independently living senior citizens aged 60 to 94 years. Overall dietary adequacy was also negatively related to degree of loneliness.

Increasing social interaction at mealtimes may improve dietary adequacy for older persons. Both Meals on Wheels and Congregate Meals provide social enhancement along with nourishment to increase nutrient intake (Walker and Beauchene 1991).

Dependence/Disability

The ability of people to care for themselves greatly affects their nutritional status. The *Determine Your Nutritional Health* checklist manages the issue of dependence and disability with the statement "I am not always physically able to shop, cook and/or feed myself." A number of national surveys have measured the degree of functional limitations in free-living older adults. The Nutrition Screening Initiative (AAFP et al. 1991b) reports that six percent of those aged 65 to 74 have difficulty shopping, and four percent find preparing meals difficult. For those over 85 years, 37 percent have trouble shopping, and 26 percent report problems with food preparation (AAFP et al. 1991a). Kovar and Feinleib (1991, p. 287) stated that "delaying the onset of dependency and disability (through preventative measures) is essential for improving the older person's quality of life."

Acute/Chronic Diseases or Conditions

The NSI checklist uses the statements "I have an illness or condition that made me change the kind and/or amount of food I eat"; "Without wanting to, I have lost or gained 10 pounds in the last 6 months"; "I have

three or more drinks of beer, liquor or wine almost every day"; and "I have tooth or mouth problems that make it hard for me to eat." These questions are designed to address conditions that commonly create nutritional problems in the older population.

Acute/Chronic Disease. Advancing age is often accompanied by acute disease and chronic conditions (Bidlack 1986). Illness can affect nutritional status in different ways. The condition may alter appetite, affect food tolerances, decrease functional status, or impair the ability for food procurement and preparation. Often, chronic conditions require modified diets which can lead to nutritional problems if the older person continues to follow the diet when it is no longer appropriate; is not medically supervised during dietary drug treatment; modifies the prescribed diet; follows dietary advice of well-meaning friends or nonprofessionals; or has not been properly advised how to take drugs in relation to the diet (Bidlack 1986). Table 1 shows the prevalence of various chronic conditions in the elderly population. Each disease can affect nutritional intake and status, and multiple conditions can further increase risk of malnutrition.

Table 1. Prevalence of selected health problems with nutritional implications among Americans over 55 years of age

Disease or Condition	Age Group and Prevalence per 100 Persons			
	55-64	65-74	75-84	85+
Diabetes Mellitus	7.2	9.4	8.7	8.1
Cerebrovascular Disease	2.7	4.2	8.1	9.9
Hypertension	30.7	39.3	39.8	39.2
Ischemic Heart Disease	9.3	13.7	13.5	12.2
Emphysema	3.1	4.4	4.1	1.7
Orthopedic Impairment	15.0	16.5	16.2	21.1
Arthritis	35.1	47.6	49.8	52.0
Health Fair or Poor	4.2	31.7	33.6	36.2
Unable to carry on major activity	11.3	10.9	7.9	19.9

Adapted from Dwyer (1991)

Body Weight Abnormalities. The relationship between weight and/or body mass index and mortality can be represented by a U-shaped curve, with the highest mortality at the upper and lower extremes (Fischer and Johnson 1990). Severe involuntary change in body weight increases the risk for poor nutritional status (AAFP et al. 1991a).

Unintentional weight loss is commonly reported in the elderly population (Fischer and Johnson 1990; Morley 1990). There is a variety of causes of weight loss among older Americans. Morley (1990) categorized the major reasons for weight loss as: social, psychological, medical, and age-related. Social causes include poverty and isolation. Depression and dementia are psychological factors that can alter food intake, resulting in weight loss. Many medical problems including cancer, anorectic drugs, dysphagia, and cardiac cachexia can lead to weight loss. Age-related causes consist of deterioration in hedonic qualities of food perception, such as sight, taste, smell, and poor dentition. Morley (1990) has suggested that weight histories should be kept for older individuals to recognize malnutrition early. Then, the cause of the weight loss must be identified and addressed.

Alcohol intake. Excessive alcohol intake can affect nutritional status by suppressing appetite and replacing nutrient-dense foods in the diet. Alcoholism can affect food absorption and cause damage to the stomach,

absorptive cells, liver, and pancreas. Alcohol can also cause nutrient deficiencies, particularly thiamin, folate, and other B vitamins. Ferro-Luzzi et al. (1988) conducted a study of free-living Italian elderly subjects to determine the effect of alcohol consumption on food intake and nutritional status. The investigators found that men classified as heavy drinkers replaced food with alcohol, whereas heavy-drinking women consumed alcohol in addition to their normal diet. Men who drank heavily had a lower intake of many nutrients compared to light-drinking men. Women who drank heavily had a similar nutrient consumption to the light-drinking women except they consumed more total calories, which resulted in a significant relationship between women's alcohol intake and body weight. Heavy drinkers of both sexes demonstrated statistically significant marginal serum levels of folate and thiamin, regardless of nutrient intake.

Oral Health. Tooth and mouth problems in the elderly include tooth loss, dental caries, lack of or poor fitting dentures, periodontal disease, xerostomia, and mouth pain, all of which can affect food intake and therefore nutritional status (AAFP et al. 1991a). The *Nutrition Screening Initiative* reported that the prevalence of oral cancer, cervical (root) caries, and edentulism increases with advancing age, all of which can threaten nutritional health (AAFP et al. 1991a). Approximately 50 percent of all Americans have lost all of their teeth by age 65. Although many have dentures, they often experience chewing problems. Wearing dentures is

significantly related to reduced dietary quality in both institutionalized and free-living older adults (Fischer and Johnson 1990).

It is estimated that one in five older adults suffers from xerostomia (Rhodus and Brown 1990). A study conducted by Rhodus and Brown (1990) found that free-living elders with xerostomia had marginal intakes of fiber, potassium, vitamin B-6, iron, calcium, and zinc. They also learned that elders with dry mouth had significantly reduced taste and food perception.

Chronic Medication Use

Older Americans comprise 12 percent of the population, but account for 30 percent of the nation's use of all prescribed and over-the-counter (OTC) medications (Smith 1990; Ferrini and Ferrini 1993). Drugs can affect nutritional status through nutrient interactions such as alterations in absorption and utilization and in appetite alterations (Fischer and Johnson 1990). As the number of medications increases, the potential for nutritional detriment increases. The *Determine Your Nutritional Health* checklist addresses the problem of polypharmacy with the statement "I take 3 or more different prescribed or over-the-counter drugs a day." In the free-living elderly population, 27 percent take at least one medication per day and 23 percent use at least five; the majority of the rest take between two and five drugs per day (AAFP et al. 1991a).

Drugs most commonly used by the elderly include analgesics, cardiac drugs such as digitalis derivative, antihypertensive agents, diuretics, anticonvulsants, anti-infective agents, laxatives, antacids, antidepressants, antiarthritic medications, and sedatives (Fischer and Johnson 1990). All of these medications have potential nutritional implications. Ferrini and Ferrini (1993) stated that all possible interactions should be known by the health care team and the patient so that action can be taken to minimize these effects. The authors also advocated treating medical problems with non-drug alternatives whenever possible to reduce or eliminate the nutritional problems associated with polypharmacy.

Advanced Age

Although advanced age is not specifically addressed by the *Determine Your Nutritional Health* checklist, functional impairment and progressive disability do tend to increase with advancing age (AAFP et al. 1991a). Murphy et al. (1990), using data from the Nationwide Food Consumption Survey 1977-78, found that both men and women over the age of 85 were more likely to have poor diets than those 65-84 years old.

Nutrition Risk of Rural Elderly

Twenty-five percent of the nations's elderly population are rural residents (Smiciklas-Wright et al. 1990). Unfortunately, this group is often underrepresented in gerontological literature because of inaccessibility. The

majority of research on rural elderly has demonstrated they have a higher incidence of health problems than urban counterparts (Davies and Knutson 1991). The poorer health of rural elderly has been attributed to less education, lower income, less accessibility to health care, and lower food availability, all of which increase risk for compromised nutritional status (Smiciklas-Wright et al. 1990; Rogers 1991; Morris et al. 1992). Also, delivery of nutrition education and health promotion services to rural areas is limited (Crockett et al. 1990).

The lack of representation of older rural residents in gerontological research samples may misrepresent the elderly, creating the illusion of an apparently healthier population (Smiciklas-Wright et al. 1990). Therefore, locating and screening the rural elderly is essential to determining their level of nutritional risk so appropriate services and education can be provided.

Screening for Risk Factors

Nutrition screening and other preventive interventions have the potential to produce a healthier and more industrious older population that could assist in reducing the nation's expenses for medical care and social support (Beers et al. 1991). The NSI is based on the premise that "better nutritional care can lead to better health and to better outcomes with respect to health and quality of life when people are ill or injured" (AAFP et al. 1992, p. 5). Although the development of malnutrition is a complex

process, it often develops in a predictable fashion. Therefore, risk factors that often lead to malnutrition can be identified. Nutrition screening initiates the process of recognizing and responding to malnutrition and has been shown to be cost effective (AAFP et al. 1992).

According to Dwyer (1991, p. 70)

> screening for risk factors holds the most promise for increasing the emphasis placed on prevention. Identifying individuals at risk provides opportunities for implementation of preventive measures before clinical manifestations of nutritional problems arise.

Posner et al. (1993a) found the *Determine Your Nutritional Health* checklist useful for screening in population-based research and related applications. The researchers surveyed a random sample of Medicare beneficiaries aged 70 years and older in New England. Participants completed the *Nutrition Screening Initiative* checklist, a 24-hour recall, and ranked their perceived health. Results showed that limited food dollars, eating fewer than two meals per day, and eating few fruits, vegetables, and dairy products were strong predictors of inadequate intake. Individuals who were taking three or more drugs per day and had changed their diet because of illness showed a poorer perception of health status. Posner et al. (1993a) determined from their results that the DYNH checklist accurately predicts overall perceived health status and identifies persons whose estimated nutrient intakes fall below the RDAs.

Application of Screening

Education Through Screening

In addition to determining nutritional well-being, use of screening can help evaluate educational needs of the elderly. Whetstone and Reid (1991) found that self-care education, including topics on nutrition, in a community setting reduced medical visits. Counseling and educational materials were cost effective. The USDA Cooperative Extension Services' mission is to "conduct nonformal educational programs based on research findings and knowledge that meets the interests and needs of people and helps them make informed decisions" (Priester 1991, p. 278). The Extension system already provides invaluable educational services to the community and has the potential to play an even greater role through its commitment to "increase its efforts to reach and teach more elderly, minority and culturally-diverse clientele" (Priester 1991, p. 285). The NSI identified the USDA Cooperative Extension Service as a good resource for educational materials on food, shopping, and preparation tips (AAFP et al. 1992).

Intervention Through Screening

According to the NSI, nutrition screening and intervention cannot depend on referring all high-risk individuals to specialists or physicians. There are too few physicians available to deal with the number of nutritional problems, and most doctors are clustered in urban areas (AAFP et al. 1992).

Therefore, the developers of the *Nutrition Screening Initiative* established service-oriented goals which are: to develop broader roles for community-based feeding programs to alleviate social isolation and depression; to improve the quality of administration and delivery of food and nutrition services in the community; and to fully integrate nutrition screening into personal health and social services (AAFP et al. 1991a). Existing social services such as congregate meals, Meals on Wheels, Older American Transporting Services, and Home Nursing Assistance have allowed seniors to remain independent. Unfortunately, approximately 81 percent of the nation's elderly do not take advantage of community services (Davies and Knutson 1991). Encouraging utilization of these programs can help the elderly reduce their risk for malnutrition.

Davies and Knutson (1991) described accomplishing the goals of the NSI through training of volunteers and workers in the community who would most frequently be in contact with the elderly, such as extension agents, community center employees, and medical profession students. The NSI states that "an interdisciplinary community-based model that uses existing programs and fosters greater collaboration among all professionals caring for older Americans can help to improve their nutritional status" and outlines a community-based strategy to promote nutritional health (AAFP et al. 1992, p. 3).

The *Nutrition Screening Initiative* provides a simple referral system based on an individual's completion of the *Determine Your Nutritional Health* checklist. A positive response to any statement on the checklist indicates what type of intervention and community services may be required as indicated in Table 2 (AAFP et al. 1992).

Using the *Determine Your Nutritional Health* checklist for intervention referral, as described in Table 2, provides a simple way for community programs to identify the nutritional risks and needs of older individuals and to alleviate some of the burden placed on physicians and the health care system.

Prediction of Services Through Screening

According to Serow et al. (1990) it would seem reasonable to assert that as the number of older persons increases, an increase in the demand for those goods and services that are disproportionately consumed by older persons would necessarily be implied. As the U.S. population progressively ages, the need for health care services will increase significantly over the next 50 years. Although the need for long-term care facilities will increase, it has been suggested that the greatest demand will be for community services (Dinkins 1991; Feather and Dillard 1991). Saffel-Shrier and Athas (1993) described using current and future demographics to develop a Comprehensive Nutrition Case Management plan that includes initial

Table 2. Selecting appropriate interventions based on positive responses on the *Determine Your Nutritional Health* checklist

Determine Your Nutritional Health	Intervention
I have an illness or condition that made me change the kind and/or amount of food I eat.	Nutrition Education & Counseling Nutrition Support
I eat fewer than 2 meals per day.	Social Services Nutrition Education & Counseling
I eat few fruits or vegetables, or milk products	Nutrition Education & Counseling Nutrition Support
I have 3 or more drinks of beer, liquor or wine almost every day.	Nutrition Education & Counseling Mental Health Medication Use
I have tooth or mouth problems that make it hard for me to eat.	Oral Health Nutrition Support Nutrition Education & Counseling
I don't always have enough money to buy the food I need.	Social Services
I eat alone most of the time.	Social Services Mental Health
I take 3 or more different prescribed or over-the-counter drugs a day.	Medications Use
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	Nutrition Education & Counseling Nutrition Support Medication Use
I am not always physically able to shop, cook and/or feed myself.	Social Services Nutrition Support

Adapted from AAFP et al. (1992)

screening/assessment as well as care plans and goals. Patient bads and required services can then be projected within the community. Planning for increased demand is important for the United States and is critical for those states whose population of old (age 75-84) or very old (age 85 -) greatly exceeds those of the rest of the nation. Statistics project the state of Utah can expect a 57 percent growth the number of people age 85 aid older (Kovar and Feinleib 1991). Results obtained from nutrition screening along with population growth statistics can be utilized to identify the degree of nutrition risk present in the elderly population and what types of services will be needed to provide appropriate intervention.

CHAPTER III

METHODOLOGY

Population and Sample

The sampling population consisted of all individuals participating in congregate meals in the state of Utah. Congregate meal site was the sampling unit. The Area Agency on Aging, which administers congregate meals, is divided into 12 districts within the state of Utah. There is a 13th district on the Ute Indian Reservation, which was excluded from sampling because it is administrated by the tribe, not the US government. Counties within each district were labeled as rural or urban according to 1990 census data, and congregate meal sites within each county were identified.

Daily and/or yearly meal counts from each of the 12 Division of Aging districts were obtained from each of the district directors and used to estimate the average number of meals served per site per day. Most sites are open Monday through Friday, but some serve meals only on select days of the week, a fact taken into consideration when determining average meals served per day. Within each district, total number of serving days open per year (including all congregate meals sites) was divided by number of meals served per year to ascertain average number of meals served per day per center (Appendix D).

Sampling of congregate meal sites involved stratification according to urbanization. Site selection was then weighted according to average number of meals served per day per center in order to more accurately represent Utah's population distribution. Selection was randomized by producing two separate tables of cumulate meals served for urban and rural congregate meal sites. Sites were included in the study when a number selected from a random number table fell within that center's cumulate score. Based on average rural meal counts, it was expected that a sample of 15 centers should provide approximately 500 rural subjects. Fifteen centers were then selected from both urban and rural centers. Appendix E lists the congregate meal sites selected, their district, urbanization, and number of participants sampled. Subjects consisted of all willing participants present at the selected congregate meal sites on the day of sampling.

Sampling Methodology

After centers were selected, center directors were contacted to obtain permission to sample and coordinate a sampling day. One rural center denied sampling access. On the day of sampling arranged with the center director, the investigator or another trained interviewer appeared at the center prior to meal time to conduct the survey. The interviewer briefly

explained the study and its purpose and asked for participants on a voluntary basis. Instructions were then given on how to complete the survey. Willing subjects were issued a pencil, a *Determine Your Nutritional Health* checklist, and a survey asking additional demographic data including age, sex, marital status, living situation, frequency of participation in congregate meals, and whether or not they had previously used the *Determine Your Nutritional Health* checklist. When participants completed the surveys, the interviewer gathered the surveys and pencils and departed from the center. Surveys were labeled according to district, center, and urbanization. All data were entered into a computer database program for statistical analysis.

Determine Your Nutritional Health **Checklist**

The *Determine Your Nutritional Health* checklist (Appendix A) is a validated survey consisting of ten questions regarding nutritional risk factors that can be answered yes or no. If the subject's response to a question is yes, the number associated with that question is circled. At the end of the questionnaire, the subject totals the circled numbers to obtain a nutritional score, which could range from zero to 21. The total nutritional score is used to classify the subject into one of three categories: good (0-2), moderate nutritional risk (3-5), or high nutritional risk (6+).

Statistical Analysis

Statistical analyses were done using the Statistical Package for the Social Sciences (SPSS). Cross-tabulations using Pearson chi-squared tests were used to determine effect of individual demographic variables on total nutritional score and relationships between demographic variables.

CHAPTER IV

RESULTS AND DISCUSSION

Population Characteristics

Sample Demographics

A total of 838 valid surveys was collected from 29 Congregate Meal Sites throughout the state of Utah. Of the 838 participants, 49 percent (n = 414) lived in rural counties, and 51 percent (n = 424) were urban residents. Male participants made up 34 percent of valid responses (n = 280) and 66 percent (n = 551) were females. Seven individuals surveyed did not indicate their gender. Age distribution of valid samples showed 79 participants under age 65 (10%); the largest percentage (40%) was aged 65-74 (n = 333); slightly fewer fell between 75-84 years (n = 314) at 38 percent, and 103 participants (12%) were over 85 years old. Nine participants withheld their age. Of those surveyed, 409 were married (49.5%), and 417 (50.5%) were not married because they were divorced, widowed, or single. Twelve subjects did not report marital status. Of participants that reported cohabitation status (55 did not respond), 355 (45.3%) lived alone, and the remaining 428 (54.7%) lived with one or more individuals. Of the subjects who indicated frequency of congregate meal participation (7 did not respond), 31.1 percent attended 4-5 times per week (n = 258); 36.3 percent attended 2-3 times per week (n = 302); 25.9 percent

consumed 1 meal per week (n = 215); and 56 attend less than once a week. Only 53 (7.1%) subjects had previously used the DYNH checklist; 690 (92.9%) indicated they had not used the checklist before; and 95 did not respond. Sample demographic findings are summarized in Table 3.

Checklist Responses

Table 4 shows frequency of positive responses to individual statements on the *Determine Your Nutritional Health* checklist. The table also displays frequencies and percentages of total nutrition scores within each nutrition risk category. Questions one, seven, and eight (illness, eat alone, and drug use) had the highest percentages of positive responses at 28.9, 33.1, and 39.7 percent, respectively.

Fifty-seven percent of participants (n = 477) had a total score of 0 - 2, which placed them in the "good" category. The 232 participants who scored 3 - 5 were considered at moderate nutritional risk (27.7%). One hundred twenty-nine (15.4%) were at high nutritional risk, scoring a 6 or higher. The participants of this study showed lower nutritional risk than percentages estimated by the NSI. The NSI reported that 24 percent of elderly are at high nutritional risk, and 38 percent are at moderate nutritional risk (Saffel-Shrier and Athas 1993). Because this study focused on congregate meal participants who may be more ambulatory than the general elderly population, the sample may reflect a healthier population.

Table 3. Sample demographic statistics

Category	Subcategory	Count	Percent
Urbanization	Rural	414	49.4
	Urban	424	50.6
Gender	male	280	33.4
	female	551	65.8
	no response	7	.8
Age	no response	9	1.1
	<65 years	79	9.4
	65-74	333	39.7
	75-84	314	37.5
	≥85	103	12.3
Marital Status	married	409	48.8
	widowed	334	39.9
	single	38	4.5
	separated	6	0.7
	divorced	39	4.7
	no response	12	1.4
Cohabitants	0	355	42.4
	1+	428	51.1
	no response	55	6.6
Congregate meal participation per week	1 time	215	25.7
	2-3 times	302	36.0
	4-5 times	258	30.8
	less than 1	56	6.7
	no response	7	0.8
Previously used the Checklist	yes	53	6.3
	no	690	82.3
	no response	95	11.3

Table 4. Count and percent of positive responses to *Determine Your Nutritional Heath* checklist statements

Checklist Statement	Count ("yes")	Percent ("yes")
I have an illness or condition that made me change the kind and/or amount of food I eat.	242	28.9
I eat fewer than 2 meals per day.	56	6.7
I eat few fruits or vegetables, or milk products.	160	19.1
I have 3 or more drinks of beer, liquor or wine almost every day.	11	1.3
I have tooth or mouth problems that make it hard for me to eat.	61	7.3
I don't always have enough money to buy the food I need.	42	5.0
I eat alone most of the time.	277	33.1
I take 3 or more different prescribed or over-the-counter drugs a day.	333	39.7
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	111	13.2
I am not always physically able to shop, cook and/or feed myself.	85	10.1
Total Nutritional Score		
Good	477	56.9
Moderate Nutritional Risk	232	27.7
High Nutritional risk	129	15.4

Nutrition Risk

This study showed that nutrition risk category was independent of urbanization ($p = .08$). As illustrated in Figure 1, nutrition risk was consistently distributed among urbanization levels. Davies and Knutson (1991) reported that the majority of research on rural elderly suggests a higher incidence of health problems in rural compared to urban elderly. After reviewing current literature, Rogers (1991) concluded that research has not clearly established that urbanization has an independent effect on health status of the elderly. This study does not show a higher nutrition risk level between rural congregate meal participants and their urban counterparts.

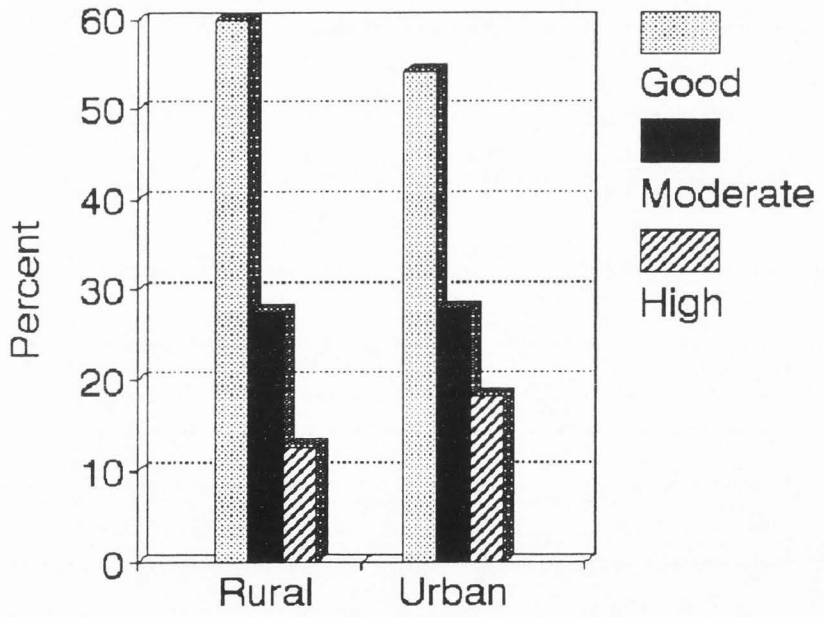

Figure 1. Nutrition risk category by urbanization

Gender was significantly associated with nutrition risk (Figure 2). Women had significantly higher nutrition risk scores than men ($p = .04$). Using 1977-78 NFCS data, Murphy et al. (1990) found a greater proportion of women than men reported poor diets. Rogers (1991) described data from the 1984 Supplement on Aging (SOA). The SOA obtained more detailed information about the health status, social characteristics, and living arrangements of free-living persons 55 years of age and older. Rogers (1991) reported that women fared worse than men did on all measures of health status. Results obtained from the studies described support the findings of this study, which showed women to be at higher nutritional risk than men.

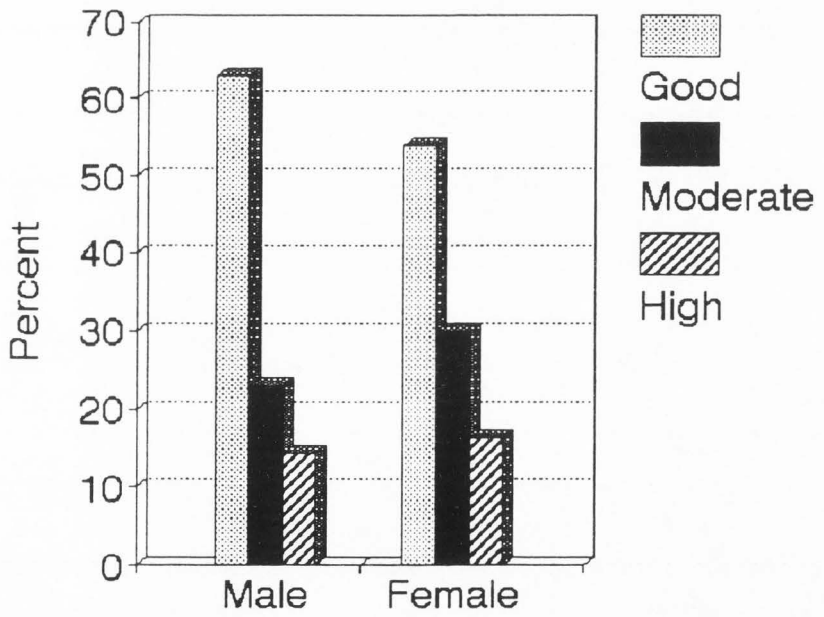

Figure 2. Nutrition risk category by gender

Nutrition risk category percentages did not significantly vary between younger and older age groups ($p = .63$) (Figure 3). The NSI identified advanced age as a risk factor for malnutrition, stating that functional impairment and progressive disability increase with advancing age, realizing that chronological age and functional capacity do not necessarily equate (AAFP et al. 1991b). Murphy et al. (1990) found that individuals over age 85 were more likely to have poor diets than those 65-84. Congregate meal participants over 85 years are most likely of higher functional capacity than nonparticipants in their age group (Smiciklas-Wright et al. 1990). This study indicates that for this population of congregate meal participants, individuals over age 85 do not show a higher proportion of nutritional risk than their younger counterparts.

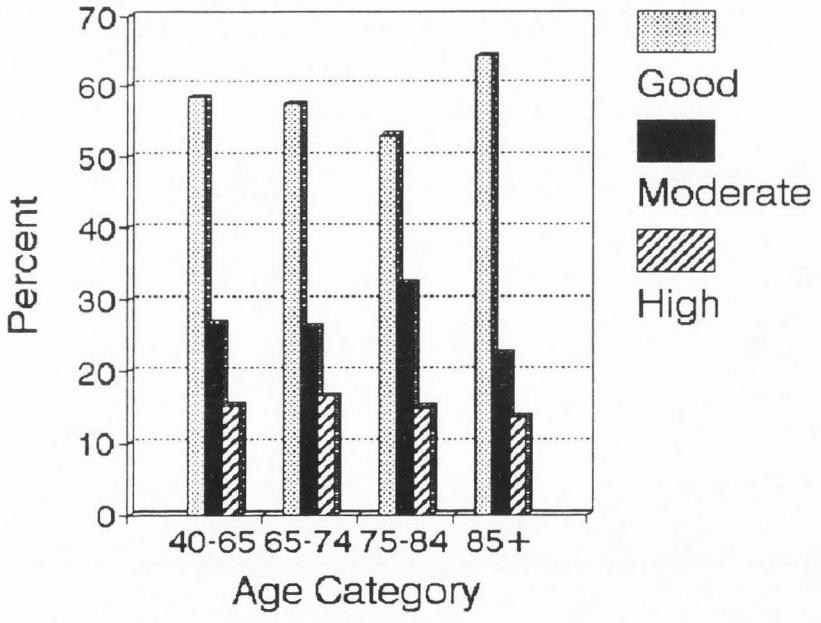

Figure 3. Nutrition risk category by age

Marital status was significantly associated with nutrition risk category ($p = .00$) As illustrated in Figure 4, unmarried participants had higher nutrition risk scores than expected and married individuals scored lower than expected. Rogers (1991) reported that 1984 SOA data indicated that marital status is associated with self-reported health status, and not being married is associated with poorer health status. Results of this investigation seem to agree with and substantiate these earlier research conclusions.

Figure 4. Nutrition risk category by marital status

Individuals who lived alone were at higher risk than those with one or more cohabitants ($p = .00$) (Figure 5). In a study conducted by Walker and Beauchene (1991), overall dietary adequacy was negatively related to degree of loneliness in the diets of 61 independently living senior citizens aged 60 to 94. Data from the 1984 SOA found elders living alone fared worse than those living with others (Rogers 1991). SOA data also indicated that elders who lived with their spouse were the healthiest as measured by self-assessments of health and physical functioning (Rogers 1991). Results from this study support findings of other researchers in showing an association between living alone and increased nutrition risk.

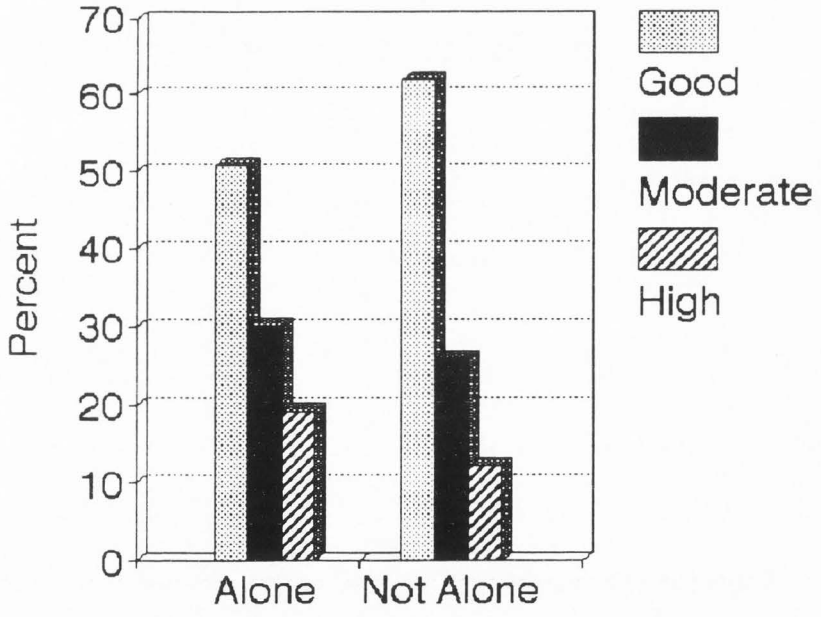

Figure 5. Nutrition risk category by cohabitation status

Nutrition risk category was not significantly affected by frequency of congregate meal participation ($p = .32$) (Figure 6). Congregate meals provide low-cost, nutritious meals that may improve nutritional status of low-income elderly (AAFP et al. 1991b). Congregate meals also provide a social environment that may also increase nutrient intake (Walker and Beauchene 1991). This study did not find frequency of congregate meal attendance to affect nutrition risk score. Participation itself may be a significant factor as a proxy for a more healthy status.

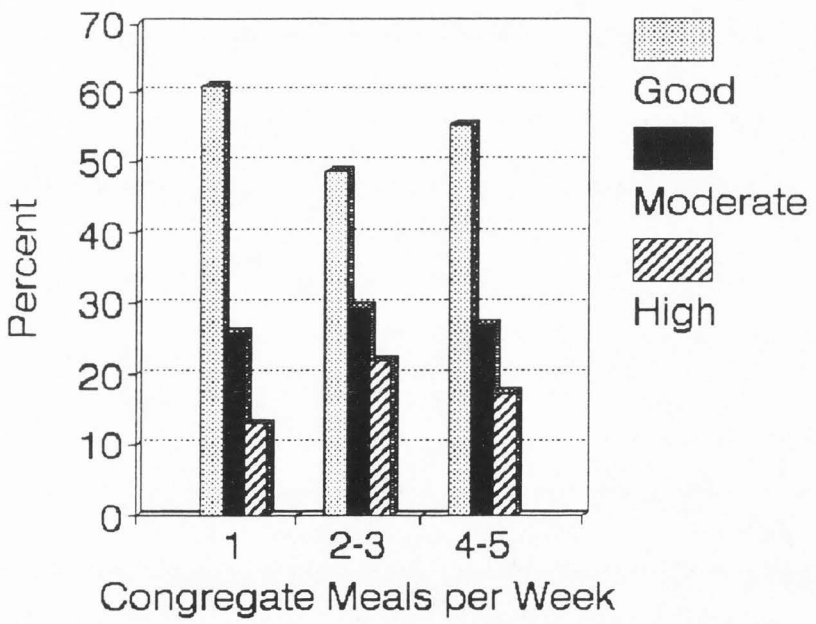

Figure 6. Nutrition risk category by congregate meal participation

Checklist Results

Responses to DYNH checklist questions four, five, and nine (alcohol intake, oral health, and body weight changes) were not significantly influenced by demographic variables. Positive responses were consistently distributed for urbanization, gender, age, marital status, and cohabitation status.

Checklist question one, "I have an illness or condition that made me change the kind and/or amount of food I eat," was significantly associated with age category. Participants over age 75 had a significantly more frequent positive response than younger participants ($p = .000$).

Marital status and urbanization were both associated with responses to question two, "I eat fewer than 2 meals per day." Rural and married subjects were less likely to have a positive response than would be expected ($p = .007$ and $p = .01$, respectively).

Unmarried participants were more likely to answer "yes" to DYNH checklist statements three and six ($p = .001$ and $p = .04$). Number three on the checklist states, "I eat few fruits or vegetables, or milk products" and number six is "I don't always have enough money to buy the food I need."

As expected, question seven, "I eat alone most of the time," was significantly associated with gender ($p = .000$), marital status ($p = .000$), and

cohabitation status ($p = .000$). Unmarried participants, females, and subjects living alone were more likely to issue a positive response.

Women were more likely to be taking three or more different prescribed or over-the-counter drugs a day than men. Females answered "yes" to question number eight more frequently than expected ($p = .006$).

Marital status was associated with question ten, "I am not always physically able to shop, cook and/or feed myself.". Unmarried individuals were significantly more likely to respond positively ($p = .001$).

Urbanization

Urban and rural participants were fairly evenly divided with 414 rural residents (49.4%) and 424 urban residents (50.6%). Within these populations, gender was consistently distributed with no significant difference in percentages of males and females between urbanization categories ($p = .71$). Distribution of age proportion was also consistent by urbanization ($p = .13$).

Gender

Males and females were consistently distributed through all age categories ($p = .13$). A significantly higher percentage of females was not married ($p = .000$) and lived alone ($p = .000$). Males were more likely to attend congregate meals once a week, or four to five times a week,

compared to females who more frequently attended two to three times per week ($p = .002$).

Age

Mean age of the sample was 74.9 years. Minimum age was 43 years and maximum was 97 years. Participants in the younger age categories ($\leq$64; 65-74) were significantly more likely to be married compared to older participants (75+ years) who were less likely to be married ($p = .00$). Age category did not seem to affect frequency of congregate meal participation ($p = .07$).

Marital Status and Cohabitation Status

Nearly half of the subjects surveyed were married (48.8%). Forty-two percent of individuals surveyed lived alone. Unmarried subjects were significantly more likely to live alone ($p = .000$).

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Restatement of the Problem

The preventative relationship between nutrition and degenerative disease has been well documented. Delaying dependence and disability among Utah's elderly can relieve some of the financial burden placed on the health care system by this expanding population. Therefore, the state of Utah needs information to identify the extent and degree of nutritional risk present in the elderly population to effectively plan and budget for health prevention, education, care programs, and allocation of services.

Purpose and Objectives

The overall purpose of this study was to determine the degree of nutritional risk present within the elderly population in rural and urban areas in the state of Utah by conducting an initial nutrition screening.

Specific objectives were to:

1) quantify the degree of nutritional risk present in the elderly population participating in congregate meal programs;
2) identify any differences in risk levels between urban and rural locations;

3) identify the need for education and/or intervention for those individuals at risk; and
4) alert available community services and health professionals to the need for follow-up and encourage implementation of additional screening tools provided by the Nutrition Screening Initiative.

Presence of Nutrition Risk

Rogers (1991), stated that the majority of elderly persons are in good health. This study agrees with that statement; finding 57 percent of participants scored a "good" on the *Determine Your Nutrition Health* checklist. However, the state of Utah needs to address nutritional concerns of the 27.7 percent classified at "moderate nutritional risk" and the 15.4 percent identified at "high nutritional risk."

Factors Affecting Risk

All of the demographic variables were significantly associated with one or more of the individual statements on the *Determine Your Nutritional Health* checklist. Overall nutritional risk category was significantly associated with gender, marital status, and cohabitation status. Among these groups, women, unmarried, and individuals living alone more frequently scored in a higher nutrition risk category.

Checklist statements one, seven, and eight ("I have an illness or condition that made me change the kind and/or amount of food I eat"; "I eat alone most of the time"; and "I take 3 or more different prescribed or over-the-counter drugs a day") had the highest percentages of positive responses at 28.9, 33.1, and 39.7 percent, respectively.

Results of this study reflect influences on nutrition risk found in a sample of congregate meal participants in the state of Utah. These results can help the state of Utah identify the common risk factors within this segment of its population. Significant risk factors recognized by this study include gender, marital status, cohabitation status, acute/chronic disease, eating alone, and polypharmacy. Knowledge of these risk factors can also be utilized to plan education and/or intervention for individuals who are at risk.

Recommendations

Recommendations for further study include:

1) enlarge the population to include institutionalized and homebound elderly and senior citizens who do not participate in congregate meals;
2) develop educational materials and plan interventions focused on risk factors pertinent to Utah's elderly population;

3) conduct Level 1 Screens provided by the *Nutrition Screening Initiative* on participants found at nutritional risk and provide referrals to appropriate services and Level 2 Screening as needed; and
4) utilize results of this study, in combination with population growth statistics to project future need of services within the State of Utah.

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APPENDICES

APPENDIX A *DETERMINE YOUR NUTRITIONAL HEALTH* CHECKLIST

The Warning Signs of poor nutritional health are often overlooked. Use this checklist to find out if you or someone you know is at nutritional risk.

Read the statements below. Circle the number in the yes column for those that apply to you or someone you know. For each yes answer, score the number in the box. Total your nutritional score.

DETERMINE YOUR NUTRITIONAL HEALTH

	YES
I have an illness or condition that made me change the kind and/or amount of food I eat.	2
I eat fewer than 2 meals per day.	3
I eat few fruits or vegetables, or milk products.	2
I have 3 or more drinks of beer, liquor or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take 3 or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
I am not always physically able to shop, cook and/or feed myself.	2
TOTAL	

Total Your Nutritional Score. If it's —

0-2 **Good!** Recheck your nutritional score in 6 months.

3-5 **You are at moderate nutritional risk.** See what can be done to improve your eating habits and lifestyle. Your office on aging, senior nutrition program, senior citizens center or health department can help. Recheck your nutritional score in 3 months.

6 or more **You are at high nutritional risk.** Bring this checklist the next time you see your doctor, dietitian or other qualified health or social service professional. Talk with them about any problems you may have. Ask for help to improve your nutritional health.

These materials developed and distributed by the Nutrition Screening Initiative, a project of:

AMERICAN ACADEMY OF FAMILY PHYSICIANS

THE AMERICAN DIETETIC ASSOCIATION

NCOA NATIONAL COUNCIL ON THE AGING, INC.

Remember that warning signs suggest risk, but do not represent diagnosis of any condition. Turn the page to learn more about the Warning Signs of poor nutritional health.

Use the word DETERMINE to remind you of the Warning Signs.

DISEASE

Any disease, illness or chronic condition which causes you to change the way you eat, or makes it hard for you to eat, puts your nutritional health at risk. Four out of five adults have chronic diseases that are affected by diet. Confusion or memory loss that keeps getting worse is estimated to affect one out of five or more of older adults. This can make it hard to remember what, when or if you've eaten. Feeling sad or depressed, which happens to about one in eight older adults, can cause big changes in appetite, digestion, energy level, weight and well-being.

EATING POORLY

Eating too little and eating too much both lead to poor health. Eating the same foods day after day or not eating fruit, vegetables, and milk products daily will also cause poor nutritional health. One in five adults skip meals daily. Only 13% of adults eat the minimum amount of fruit and vegetables needed. One in four older adults drink too much alcohol. Many health problems become worse if you drink more than one or two alcoholic beverages per day.

TOOTH LOSS/ MOUTH PAIN

A healthy mouth, teeth and gums are needed to eat. Missing, loose or rotten teeth or dentures which don't fit well or cause mouth sores make it hard to eat.

ECONOMIC HARDSHIP

As many as 40% of older Americans have incomes of less than $6,000 per year. Having less--or choosing to spend less--than $25-30 per week for food makes it very hard to get the foods you need to stay healthy.

REDUCED SOCIAL CONTACT

One-third of all older people live alone. Being with people daily has a positive effect on morale, well-being and eating.

MULTIPLE MEDICINES

Many older Americans must take medicines for health problems. Almost half of older Americans take multiple medicines daily. Growing old may change the way we respond to drugs. The more medicines you take, the greater the chance for side effects such as increased or decreased appetite, change in taste, constipation, weakness, drowsiness, diarrhea, nausea, and others. Vitamins or minerals when taken in large doses act like drugs and can cause harm. Alert your doctor to everything you take.

INVOLUNTARY WEIGHT LOSS/GAIN

Losing or gaining a lot of weight when you are not trying to do so is an important warning sign that must not be ignored. Being overweight or underweight also increases your chance of poor health.

NEEDS ASSISTANCE IN SELF CARE

Although most older people are able to eat, one of every five have trouble walking, shopping, buying and cooking food, especially as they get older.

ELDER YEARS ABOVE AGE 80

Most older people lead full and productive lives. But as age increases, risk of frailty and health problems increase. Checking your nutritional health regularly makes good sense.

The Nutrition Screening Initiative, 2626 Pennsylvania Avenue, NW, Suite 301, Washington, DC 20037

APPENDIX B. NUTRITION SCREENING INITIATIVE - LEVEL 1 SCREEN

LEVEL I SCREEN

To Be Completed by a Social Service or Health Care Professional or Other Trained Personnel

	VALUE	MEASUREMENT ABNORMAL	
		YES	NO
HEIGHT (IN.) WEIGHT (LBS.)			
%DESIRABLE BODY WEIGHT			
WEIGHT LOSS/GAIN IN 6 MONTHS			

	YES	NO
DIETARY DATA		
Does not have enough food each day		
Number of days per month without any food		
Poor appetite		
Usually eats alone		
Difficulty chewing or swallowing		
Problems with mouth, teeth or gums		
Housebound		
Eats milk or milk products daily		
Eats fruits and vegetables daily		
On a special diet		
USUAL DAILY FOOD INTAKE (Optional):		
Less than 2 servings of milk or dairy products		
Less than 2 servings of meat/poultry/fish/eggs		
Less than 2 serving of fruit/juice		
Less than 3 servings of vegetables		
Less than 6 servings of bread/cereals/grains		
More than 2 ounces of alcohol for men		
More than 1 ounce of alcohol for women		

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LEVEL I SCREEN

Page 2

	YES	NO
LIVING ENVIRONMENT:		
Income less than $6000/year/person		
Lives alone		
Concerned about home security		
Inadequate heating or cooling		
No stove or refrigerator		
Unable or prefers not to spend money on food		
FUNCTIONAL STATUS:		
Needs assistance with:		
Bathing		
Dressing		
Continence		
Toileting		
Eating		
Ambulation		
Transportation		
Food preparation		

Identified problems should be referred to the appropriate health care professional such as physician, nurse, social worker, dietitian, dentist, case manager, etc.

REFER TO A PHYSICIAN IF:

An involuntary increase or decrease in weight of greater than 10 lbs in the past 6 months.

A body weight that is 20% above or below desirable body weight.

REFER TO A DIETITIAN FOR FOOD RELATED PROBLEMS.

REPEAT THIS SCREEN YEARLY OR IF A MAJOR CHANGE IN STATUS OCCURS.

APPENDIX C. NUTRITION SCREENING INITIATIVE - LEVEL 2 SCREEN

LEVEL II SCREEN

Additional Information to be Obtained Following Referral to a Physician or Other Qualified Health Care Professional

	VALUE	MEASUREMENT ABNORMAL	
		YES	NO
HEIGHT (IN.) WEIGHT (LBS.)			
% DESIRABLE BODY WEIGHT			
BODY MASS INDEX			
WEIGHT LOSS/GAIN IN 6 MONTHS			

	YES	NO
DIETARY DATA:		
Does not have enough food each day		
Number of days per month without any food		
Poor appetite		
Usually eats alone		
Special dietary needs		
Self-defined		
Prescribed		
Problems with compliance/meeting special needs		
Multiple diet prescriptions		
Other unusual dietary practices		
USUAL DAILY FOOD INTAKE:		
Less than 2 servings of milk or dairy products		
Less than 2 servings of meat/poultry/fish/eggs		
Less than 2 serving of fruit/juice		
Less than 3 servings of vegetables		
Less than 6 servings of bread/cereals/grains		
More than 2 ounces of alcohol for men		
More than 1 ounce of alcohol for women		
LABORATORY AND ANTHROPOMETRIC DATA		
Serum albumin less than 3.5 gms/dl		
Serum cholesterol less than 160 mg/dl		
Serum cholesterol greater than 240 mg/dl		
Triceps skin fold thickness below 10% of desirable		
Mid arm muscle circumference below 10% of desirable		

LEVEL II SCREEN

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	YES	NO
CLINICAL FEATURES:		
Difficulty chewing or swallowing		
Problems with mouth, teeth or gums		
Skin changes suggest malnutrition		
Angular stomatitis		
Glossitis		
History of bone pain		
Bone fractures		
LIVING ENVIRONMENT:		
Income less than $6000/year/person		
Lives alone		
Concerned about home security		
Inadequate heating or cooling		
No stove or refrigerator		
Unable or prefers not to spend money on food		
FUNCTIONAL STATUS:		
Needs assistance with:		
Bathing		
Dressing		
Continence		
Toileting		
Eating		
Ambulation		
Transportation		
Food preparation		
Shopping		
MENTAL/COGNITIVE STATUS:		
Mini-Mental Examination indicates impairment (score < 26)		
Depression Scale suggests depression (Beck < 15, GDS > 5)		
DRUG USE:		
More than 3 prescription drugs		
More than 3 nonprescription drugs		
Vitamin and mineral supplements		

LEVEL II SCREEN

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CRITERIA FOR THE RECOGNITION OF COMMON PROBLEMS FROM COMPLETION OF THE SCREEN.

Is there weight loss or is the patient underweight?

Weight loss greater than 10% in last 6 months.
Body weight less than 80% of desirable weight.
Triceps skinfold thickness below the 10th percentile.
Midarm muscle circumference below 10th percentile.

Is there evidence of protein energy (hypoalbuminemic) malnutrition?
Serum Albumin less than 3.5 g/dL.

Is there evidence suggesting osteoporosis or mineral deficiency?
History of bone pain or bone fractures.
Patient housebound.

Is there evidence of hypovitaminosis or mineral deficiency?
Angular stomatitis, glossitis or bleeding gums.
Inadequate intakes of fruit and vegetables.
Pressure ulcers.

Is there evidence of obesity or hypercholesterolemia?
Weight greater than 120% of desirable weight.
Serum cholesterol greater than 240 mg/dL.

Should the patient be referred to a dietitian or community nutrition program?
Food intake inappropriate, inadequate or excessive.
Problems complying with specialized diet.
Need for nutrition specific counseling or education, related to specific diseases.
Functionally dependent for eating or food-related activities of daily living.

IDENTIFIED PROBLEMS SHOULD BE REFERRED TO THE APPROPRIATE HEALTH CARE PROFESSIONAL SUCH AS A PHYSICIAN, NURSE, SOCIAL WORKER, DIETITIAN, DENTIST, CASE MANAGER, ETC.

APPENDIX D. AVERAGE NUMBER OF CONGREGATE MEALS SERVED AT RURAL AND URBAN SENIOR CENTERS IN UTAH

Appendix D. Average number of congregate meals served at rural and urban senior centers in Utah

District	County	# of Centers	Avg # of meals per day per center	Urbanization
1	Cache	1	40	urban
1	Box Elder	2	40	rural
1	Rich	1	40	rural
2A	Morgan	1	80	rural
2A	Weber	13	80	urban
2B	Salt Lake	16	50	urban
2C	Davis	3	63	urban
2T	Tooele	2	35	rural
3	Summit	3	40	rural
3	Utah	10	40	urban
3	Wasatch	1	40	rural
4	Millard	3	24	rural
4	Sanpete	4	24	rural
4	Sevier	4	24	rural
5	Beaver	2	30	rural
5	Garfield	3	30	rural
5	Iron	2	30	rural
5	Kane	2	30	rural
5	Washington	3	30	rural
6A	Daggett	1	83	rural
6A	Duchesne	2	83	rural
6C	Unitah	1	100	rural
7A	Carbon	2	32	rural
7A	Emery	5	32	rural
7A	Grand	1	32	rural
7B	San Juan	4	14	rural

APPENDIX E. SELECTED SAMPLING SITES, DISTRICT, URBANIZATION AND NUMBER SAMPLED

Appendix E. Selected sampling sites, district, urbanization and number sampled

Congregate Meal Site	District	Urbanization	# Sampled
Rich Co. Senior Citizens' Center; Woodruff	1	rural	0*
Ben Lomond High Nutrition Site; Ogden	2A	urban	15
Lomond Gardens Nutrition Site; Ogden	2A	urban	11
Morgan Senior Center; Morgan	2A	rural	47
Plain City Nutrition Site; Plain City	2A	urban	25
Central City Community Center; SLC	2B	urban	34
Magna Senior Center; Magna	2B	urban	25
Northwest Multi-Purpose Center; SLC	2B	urban	32
Sandy Senior Center; Sandy	2B	urban	30
South Salt Lake Senior Center; SLC	2B	urban	33
Sunday Anderson Westside Sr. Center; SLC	2B	urban	33
Tenth East Senior Center; SLC	2B	urban	27
Autumn Glow Center; Kaysville	2C	urban	52
American Fork Senior Center; American Fork	3	urban	21
Orem Senior Friendship Center; Orem	3	urban	30
Park City Senior Citizens; Park City	3	rural	37
Pleasant Grove Center; Pleasant Grove	3	urban	19
Springville Senior Citizens; Springville	3	urban	37
Wasatch County Senior Citizens; Heber	3	rural	14
Gunnison Senior Citizen Center; Gunnison	4	rural	12
Homer Olsen Senior Center; Monroe	4	rural	22
Hurricane Senior Citizens; Hurricane	4	rural	41
Milford Senior Center; Milford	4	rural	15
Old Timers Center; Manilla	6A	rural	27
Duchesne Senior Center; Duchesne	6A	rural	39
Roosevelt Senior Center; Roosevelt	6A	rural	48
Emery Friendship Center; Emery	7A	rural	14
Green River Golden Age; Green River	7A	rural	23
Karl Peterson Senior Center; Price	7A	rural	44
Monticello Senior Center; Monticello	7B	rural	31

*Declined participation

APPENDIX F. PERMISSION LETTER

Permission Letter

August 12, 1994
Rachel T. Rood
2208 Prairie Glen Pl.
Manhattan, KS 66502
(913) 776-7652 hm; (913) 776-4779 wk

Nutrition Screening Initiative
1010 Wisconsin Ave.
Suite 800
Washington, D.C. 20007

Attn: Alice Coleman,

I am in the process of preparing my thesis in the Nutrition and Food Sciences Department at Utah State University. I hope to complete in the Fall of 1994.

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